Carcinoma of the Esophagus

H. BRODIE STEPHENS, M.D.,* San Francisco

CARCINOMA OF THE ESOPHAGUS is not a rare disease. It constitutes about 4 per cent of all malignant lesions of the gastrointestinal tract. If one includes lesions arising in the cardia of the stomach near the esophageal opening, then about 10 per cent of all gastrointestinal malignant tumors are in this area. Unless successfully treated, the disease is uniformly lethal, generally within one year of symptomatic onset. Death results from inanition, metastasis or a complicating infection.

The disease is more common in men and reaches its peak incidence in the early sixties; in women it tends to occur at an earlier age and has a predilection for the proximal third of the tract. In men, the middle and distal thirds are principally involved. The hypopharynx and esophagus are sometimes affected together, and it is then difficult to establish the exact site of the origin of the lesion. An important predisposing cause in women is the atrophic esophageal mucous membrane characteristic of the Plummer-Vinson syndrome.

Carcinoma of the esophagus varies in gross appearance. Most often it is a rough-surfaced, button-like lesion involving part of the circumference of the lumen. Ultimately the entire wall may become involved in a broad, encircling lesion and the lumen may be decidedly reduced. Some small growths may produce early stenosis as a consequence of a pronounced desmoplastic reaction (scirrhous carcinoma.) Most difficult to diagnose are the malignant lesions that resemble leukoplakia or those that remain largely submucosal. In the case of the latter, very little mucous membrane may become ulcerated. The lesion is like a mole's burrow in character, surfacing at several points in the form of a series of malignant nodules or ulcers, a point of practical import in connection with surgical resection.

Most malignant tumors of the esophagus are poorly-differentiated epidermoid lesions. At the lower end of the esophagus or rarely elsewhere, there may occur lesions of adenocarcinomatous structure. Those adenocarcinomas occurring at the lower end of the esophagus probably arise in the stomach and extend upward into the esophagus.

Metastatic spread of carcinoma of the esophagus is chiefly by lymphatic channels. When the lesion involves the upper two-thirds of the esophagus, the secondary deposits are found in the mediastinal, parabronchial and deep cervical lymph nodes. The lesions in the lower third spread into the nodes along the lesser curvature of the stomach.

Malignant tumors penetrating the wall of the esophagus have access directly to the vital structures of the neck and mediastinum. In the upper third, the trachea, nerves such as the recurrent laryngeal nerve, and the great vessels may be invaded. In the middle third, there may be invasion of the trachea or left main stem bronchus, and ultimately a tracheo-esophageal fistula may result. Pulmonary complications are common in the late stages of the disease. Bronchial obstruction or aspiration of food particles are the chief sources of such complications.

SYMPTOMS AND DIAGNOSIS

There is only one important symptom in carcinoma of the esophagus and that symptom is dysphagia. Any patient over 40 years of age who gives the history of difficulty in swallowing or even any change in swallowing from the normal should be viewed with the suspicion of primary carcinoma of the esophagus until this diagnosis is proven incorrect. Symptoms of early esophageal carcinoma are minimal. Transient choking on dry crumbs or upon swallowing a large bolus, or a vague discomfort on swallowing must be viewed with active suspicion if any improvement in the early diagnosis of this disease is to be accomplished. When dysphagia becomes evident, it is first for solid foods, then soft foods, and eventually liquids. Regurgitation, weight loss, anemia, hematemesis, hoarseness, cough, thoracic back pain and dehydration are late symptoms and signs. Unfortunately the great majority of patients suffering from carcinoma of the esophagus first present themselves to the physician with the chief complaints of difficulty in swallowing and weight loss. On the average, these symptoms have

*Department of Surgery, University of California School of Medicine, San Francisco.

To appear as part of the revised Cancer Studies.

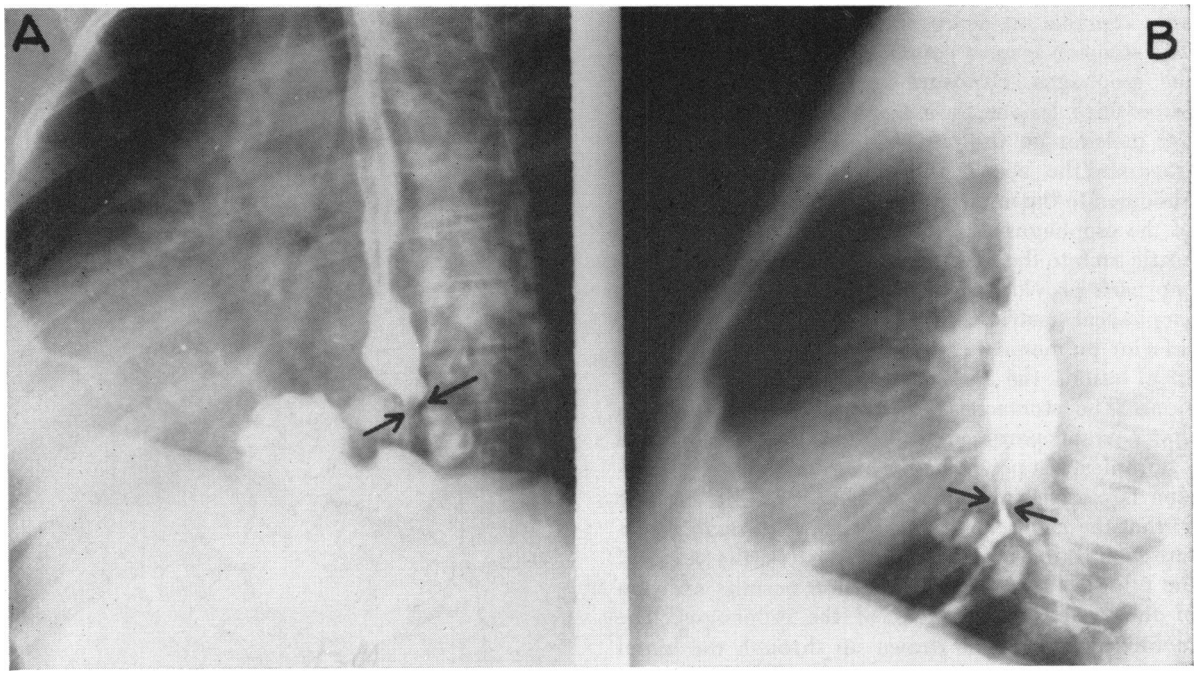

Figure 1.—Contrast studies of the cardioesophageal junction in a man 65 years of age in 1961. This patient was known to have had a sliding hiatal hernia since 1954. Film at left shows appearance of the cardioesophageal junction on February 27, 1956. The arrows indicate the point of union between the esophagus and the supra-diaphragmatic portion of the stomach. Film at right is of the same area on March 29, 1961, the arrows pointing to the cardioesophageal junction. Biopsy of a specimen taken from the area of stricture revealed adenocarcinoma on this date.

been present for six months and the weight loss is usually significant, averaging over twenty-five pounds. [1,5]

The diagnosis of carcinoma of the esophagus can be established readily in the majority of cases. Thorough roentgen ray study with the use of thin and thick mixtures of barium will disclose even a very small filling defect in the esophageal mucosa. Fluoroscope examination is a part of the roentgen study, as it will reveal abnormalities in the muscular function of the esophagus. Recently cinefluoroscopy has become available in many clinics. This method of investigation is particularly helpful since it permits repeated visualization of the fluoroscopic image and thereby intensifies the detail of abnormalities in the muscular function of the esophagus. In the vast majority of cases the diagnosis of carcinoma can be proved or disproved by esophagoscopic examination. The instrument can usually be introduced after the pharynx is locally anesthetized. General anesthesia is required for highly nervous patients or for those having a short, thick neck with limited mobility. A satisfactory biopsy specimen can usually be obtained through the esophagoscope. Sometimes obtaining adequate visualization at the lower end of the esophagus is difficult, for carcinoma there may cause so much stenosis that the esophagoscope cannot be introduced deep enough. In such a case there is not sufficient lumen to permit the biopsy forceps to penetrate into the actual malignant growth. The diagnosis in such circumstances must always be carcinoma of the esophagus until proven otherwise. Exploratory thoracotomy may be required to establish the correct diagnosis.

Stenosis at the distal end of the esophagus may be the result of peptic esophagitis in association with a sliding hiatal hernia. Cardiospasm also will cause obstruction in the region of the cardioesophageal junction. These two disease entities enter into differential diagnosis of obstructive lesions of the lower third of the esophagus. They can usually be differentiated from carcinoma of the esophagus by history, roentgen examination, esophagoscopic findings and biopsy. However, one must always be cognizant that carcinoma can occur in conjunction with either a sliding hernia (FIG. 1) or cardiospasm. Therefore, one must view with suspicion increasing symptoms of obstruction in a patient who is believed to have a benign disease. It is only by being constantly suspicious of a possible malignant tumor appearing at the site of chronic obstruction that the correct diagnosis will be established.

OPERATIVE PROCEDURES

Operative procedures for excision of malignant tumors of the esophagus and cardioesophageal area have now become standardized and can be carried out with an acceptable proportion of survivals and

an acceptable incidence of morbidity and mortality. The stomach is most commonly employed to replace the esophagus. Exposure may be obtained in the lower-third lesions by a combined thoraco-abdominal incision on the left side. This incision, which traverses the costal arch and extends across the abdomen to the mid-line, provides excellent exposure of the esophagus and stomach from the level of the aortic arch to the first portion of the duodenum. This approach provides adequate exposure to reestablish esophageal gastric continuity up to the level of the inferior pulmonary vein. In the middle-third esophageal lesions, the author prefers to employ two incisions. The stomach is first mobilized through an upper right paramedian abdominal incision and pyloroplasty is performed. Then the abdominal incision is closed and patient is turned on his left side so that the right chest can be opened through a postero-lateral incision at approximately the level of the 6th rib. This thoracic incision permits excision of the distal three-fourths of the esophagus. The mobilized stomach is drawn up through the hiatal opening and continuity is established at the level of the apex of the pleural cavity.

The Wookey procedure provides a very satisfactory method for dealing with lesions involving the lower part of the pharynx and upper portion of the esophagus. This operation is a two-stage procedure. At the first operation, a transversely-placed rectangular, full-thickness skin flap is fashioned. The involved tissue is then excised, usually the larynx, pharynx and upper cervical esophagus. A unilateral dissection of the lymph nodes of the neck may be included in the excision of the involved structures. The skin flap in then utilized to construct a deep skin-lined groove connecting the pharynx above and the esophagus below. A period of six to twelve weeks is then required for the transplanted skin to pick up an adequate blood supply. When this has occurred, the skin-lined groove is converted into a skin tube. In most cases the cosmetic and functional results are good.

A report by Mustard[4] on 381 patients with carcinoma of the esophagus admitted to the Toronto General Hospital presents fairly typical survival statistics for this disease. Taking the whole group into account, regardless of the kind or completeness of treatment, over half of the patients were dead within six months; four out of five died within one year of admission; less than one out of ten lived as long as two years and only three out of a hundred survived five or more years. Of eight five-year survivors, five had lesions of the hypopharynx, two adenocarcinomas of the abdominal esophagus and only one had a squamous cell carcinoma of the intrathoracic esophagus.

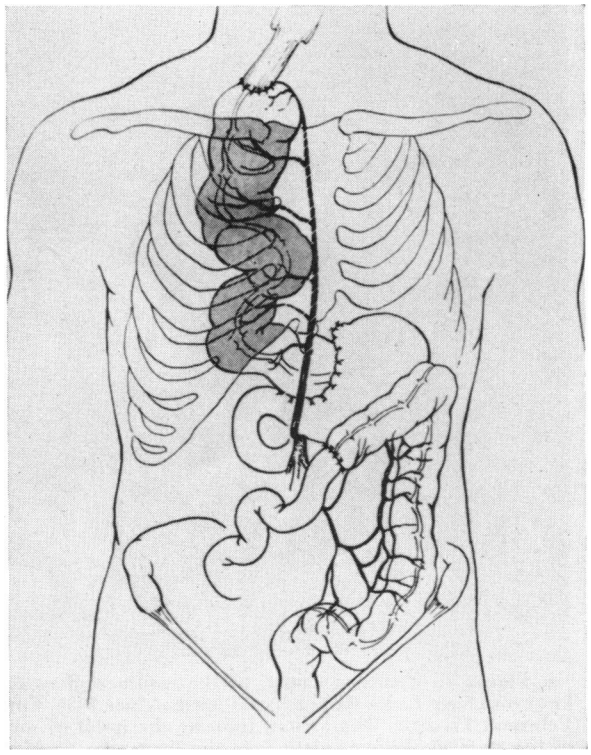

Figure 2.[6]—For by-pass of the esophagus by substernal transfer of the right colon, the right colon segment is brought up through a substernal tunnel into the neck where it is joined to the cervical esophagus. The lower end of the colon is joined to the anterior wall of the stomach. The blood supply to the mobilized segment is provided by the middle colic artery and vein.

There appears to be general agreement that carcinoma of the lower esophagus and adenocarcinoma arising in the cardiac end of the stomach and extending upward into the esophagus are primarily surgical diseases. Many observers believe that carcinoma elsewhere in the esophagus should be treated by radiation without any attempt to remove the tumor surgically. Mustard's[3] results in a limited number of cases in which the tumors were located between the base of the epiglottis and no lower than 4 cm below the cricopharyngeous muscle indicated that excision offers the best chance for prolonged survival.

Regardless of the low cure rates (Table 1) it must be admitted that the palliation of obstructive dysphagia and perhaps the prevention of ulcerating tracheo-esophageal fistula are worthwhile results of surgical operation. However, well-directed, deep x-ray therapy may provide equivalent palliation, particularly in the middle-third and upper-third lesions in patients who are debilitated or of advanced age. The possibility of improving the treatment of esophageal cancer of the epidermoid or anaplastic types by routine employment of radiation therapy before surgical exploration and excision is now being evaluated in a number of clinics.

Relief of the obstruction to swallowing in the inoperable case of carcinoma of the esophagus in which relief is not obtained by radiation therapy can be provided by several palliative procedures: Dilatation of the tumor-bearing area under direct esophagoscopic vision is one. Another is insertion of a plastic tube through malignant stricture or complete by-pass of the esophagus by substernal transfer of the right colon (FIG. 2) are available palliative maneuvers. As a rule the author prefers not to employ gastrostomy for feeding purposes, although some radiotherapists prefer that the patient be fed through a gastrostomy tube during the period of radiation therapy. In addition, patients with total esophageal obstruction who are receiving roentgen therapy may require gastrostomy until the obstruction is relieved by the radiation treatment.

TABLE 1.—*Carcinoma of the Thoracic Esophagus and Cardia—Operative Mortality and Survival in Eight Large Series*[1]

Surgeon	Year of Report	No. Cases Resected	Operative Deaths	Number of Survivors		
				Immediate	2-year	5-year
Garlock	1954	180	57	123	27	11
Wu	1955	152	28	124	24	6
Sweet	1956	327	57	270	83	24
Petrov	1957	123	62	61	....	6
Lortat-Jacob	1957	308	102	206	51	10
Nakayama	1959	953	56	897	151	35
Ellis	1959	245	39	206	....	20
Miller	1962	141	33	108	....	22
Totals		2,429	434	1,995		134
Per cent			17.8			5.5

SUMMARY

Carcinoma of the esophagus is a disease of relatively high incidence. The male particularly is likely to be stricken with this disease between the ages of 50 and 70. The diagnosis can be made easily and reasonably early if the physician to whom the patient first describes symptoms visualizes the esophagus by roentgenographic examination and the esophagoscope in every case in which there is complaint of dysphagia, no matter how slight this symptom. Carcinoma of the lower third of the esophagus and the cardiac end of the stomach are best managed by surgical excision or palliative resection. The Wookey procedure offers the best prognosis in a selected group of tumors involving the hypopharynx and adjacent few centimeters of the esophagus. The results of treatment of carcinoma involving the middle and upper thirds of the esophagus are poor whether surgical or roentgen therapy are utilized. The combination of preoperative radiation followed by surgical excision, if the latter is possible, may increase the number of five-year survivals in cases in which the carcinoma is located in the middle and upper thirds of the esophagus.

384 Post Street, San Francisco, California 94108.

REFERENCES

1. Keith, H. B.: Carcinoma of the esophagus, A.M.A. Arch. of Surg., 80:434, 1960.

2. Lindskogg, G. E., Liebow, A. A., and Glenn, W. W.: Thoracic and Cardiovascular Surgery with Related Pathology, Appleton-Century-Crofts, New York, 1962. Modified from table on page 521.

3. Mustard, R. A.: The use of the Wookey operation for carcinoma of the hypopharynx and cervical esophagus, Surg., Gyn. & Obs., 111:577, 1960.

4. Mustard, R. A.: Selection of therapy for esophageal cancer, A.M.A. Arch. of Surg., 75:674, 1957.

5. Parker, E. F., Gregorie, H. B., and Hughes, J. C.: Carcinoma of the esophagus, Ann. of Surg., 153:957, 1961.

6. Watson, W. L., Goodner, J. T., Miller, T. P., and Pack G. T.: Torek esophagectomy. The case against segmental resection for esophageal cancer, Journal of Thoracic Surgery, 32:354, 1956.